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SCIENCE AND TECHNOLOGY

No. 108

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CHINA REPORT

SCIENCE AND TECHNOLOGY

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NATIONAL DEVELOPMENTS

'RENMIN RIBAO' EDITORIAL STRESSES SCIENCE

OW072325 Beijing XINHUA Domestic Service in Chinese 1208 GMT 7 Jun 81

[Editorial report on p 1 of RENMIN RIBAO, 7 June: "Vie With Each Other as Warriors in Scaling the Heights of Science and Technology"]

[Text] Beijing, 7 Jun (XINUUA)--In addition to its front page report on a special-class invention award given by the State Scientific and Technological Commission and the State Agricultural Commission to a scientific research coordinating group for breeding xian-type hybrid rice, today's RENMIN RIBAO also publishes an editorial entitled "Vie With Each Other as Warriors in Scaling the Heights of Science and Technology."

The editorial says: Since the establishment of a system of awards for inventions, this is the first special class award ever given. The successful cultivation of hybrid rice of the male sterile line, which is of tremendous economic value, has not only opened a new way to a big increase in rice production but has also broken our predecessors' set pattern and enriched the theory and practice of heredity in hybrid rice seeds. Many noted international rice experts acknowledge that our country leads the world in research and extension of hybrid rice.

The editorial says: Since the 3d plenary session of the 11th CCP Central Committee, we have been pursuing an open-door policy in dealing with other countries. In our contacts with other countries, we have learned a lot. In a failure of analysis, however, some people regard everything foreign as good, put blind faith in foreigners and improperly belittle themselves. This successful cultivation of hybrid rice is sound teaching material for those people.

The editorial says: Our country has led the world and made brilliant achievements in astronomy, geography, mathematics, physics, chemistry, architecture, medicine, agronomy...and in many other fields for long historical periods. However, our country has lagged behind in modern times because of imperialist aggression and oppression and exploitation by the reactionary ruling class at home. In old China, a semicolonial and semifeudal society, the Chinese people were smeared by foreigners as "benighted" and were regarded as an inferior nation. The victory of the Chinese people's revolution made a clean sweep of the servility of the reactionary ruling class, national nihilism and our national inferiority complex. The radical change of our social system, the development of our economic construction and our scientific and technological achievements in, for example, nuclear technology, carrier rocket technology, synthetic bovine insulin and the successful launching and recovery of manmade satellites has made the world look at us with new eyes. Through the efforts of our scientists and technicians in the first 17 years after the founding of the PRC, the gap between China's scientific level and advanced world levels narrowed. During the 10 catastrophic years, the Lin Biao and the Jiang Qing counterrevolutionary cliques disrupted scientific and technological undertakings and persecuted scientists and technicians, thus again broadening this gap. However, with deep love for the motherland, with firm faith in our party and with a sense of responsibility as masters of the country, our scientists and technicians still quietly immersed themselves in hard work and persisted in engaging in scientific research in those difficult days. Comrades like Yuan Longping continued their efforts without interruption, thus successfully cultivating hybrid rice. Many countries have done research on hybrid rice of the male sterile line but have not yet succeeded. But, our country was the first to successfully breed the hybrid and popularize it. This once again shows that our scientists and technicians have great intelligence as well as high aspirations and creative power. We have full strength and confidence that we can stand on our own feet in the ranks of the nations of the world.

The editorial says: Compared with advanced world levels, the scientific and technological level of our country is still rather low. We resolutely oppose "looking at the sky from the bottom of a well" and "parochial arrogance." We should practice "the doctrine of taking things from others" advocated by Li Xun and study other countries' advanced science and technology suited to the conditions of our country in order to make foreign things serve China. However, we must not improperly belittle ourselves and so blindly worship foreign things as to lose our self-confidence and become dispirited.

In the past 30 years, we have trained and tempered millions of scientists and technicians to a fair educational level. This contingent of scientists and technicians who are loyal to the motherland and the people and who have firm faith in the party and socialism is a force that can be completely relied on. After summing up our experiences and lessons over the past 30 years, we have clearly realized the role of science and technology as a productive force. We are fostering an atmosphere of respecting science and scientists throughout the party and society and are starting to gradually improve the conditions for the livelihood, work, study and advanced study of scientists and technicians. Although we shall still meet with various difficulties as we advance, we have the confidence and strength to surmount them and to scale world heights in science and technology in order to bring benefit to the people, to win honor for the country and the nation and to make contributions to mankind.

The editorial points out: The extension of hybrid rice on large tracts of farmland has effectively promoted our country's agricultural development. This once again proves the correctness of the party's policy that it is necessary to rely on policy and science in developing agriculture. When the question of the system of responsibility in agricultural production is basically solved, it will be more necessary to rely on science to develop agricultural production. Party committees and governments at all levels must attach importance to agricultural science, improve and strengthen their leadership over agricultural scientific research units and agricultural colleges and schools and correct the ideas and practices that 16 more agricultural science and education. It is necessary to concientiously implement the policy toward intellectuals, to further arouse the socialist enthusiasm of large numbers of agricultural scientific researchers, agricultural technicians, experienced old peasants and educated young people in the countryside and to give full play to their role as the mainstay in agricultural economic construction. In fact, we must rely on policy and science not only to develop agriculture but to develop industry as well. We must rely on science and technology to build a modern, powerful socialist country. All party comrades and cadres must attach great importance to the role of science and pay close attention to bringing scientists' power into full play.

CSO: 4008/378

PHYSICAL SCIENCES

AERODYNAMICAL BEHAVIOR AROUND COMBINED BODIES SIMULATED

Beijing LIXUE XUEBAO [ACTA MECHANICA SINICA] in Chinese No 2, 1981 pp 194-198

[Article by Wu Zhenyu [0702 2182 1342] of the 89956 Unit of the Chinese People's Liberation Army, Li Fenglin [2621 7364 2651] of Computer Center, Chinese Academy of Sciences and Lin Baozhen [2651 0202 4176] of Chinese Academy of Space Technology: "Statistical Simulation for the Aerodynamical Behavior of the Transitional Region of Flow Past Combined Bodies of Revolution With Arbitrary Angles of Attack"]

[Text] (Received March 1980)

I. Introduction

Aerodynamic studies of rarefied gas have important significance for objects making extended flights in outer space, such as satellites, manned-spaceships and spacecrafts.[1] For the past 10 years, researchers engaged in aerodynamic studies of rarefied gas have been trying to solve the Boltzmann equation but so far there has been no major breakthrough. For urgent practical problems, one can only resort to empirical and engineering methods. However, the statistical simulation method developed by Bird[2,3] can provide aerodynamic data for spacecrafts almost for the entire transitional region.

Based on the work of Bird[2] and that in Ref. 4, we have established a statistical model for the three-dimensional flow past combined bodies of revolution and performed a series of calculations for a short obtuse cone with a spherical platform base. We obtained, in our computation, pressure coefficient c_p, friction coefficient c_f, thermal exchange coefficient st, axial force coefficient c_A, normal force coefficient c_N, moment coefficient c_m, and the position of the pressure center, x_{cp}. In order to improve the efficiency of the simulation and expand the simulation region, we adopted a simulation molecule weighting technique based on the ideas of Bird.[2] The computation results are basically in agreement with the experiment and some of the computation results will be briefly presented in this paper.

II. Description of the Method

The essence of the statistical simulation method is to simulate the flow process of the gas with a computer. To do this, we focus on a region of space called the flow field. In this work we used a cylindrical flow field and placed the object at the middle of the flow field. The symmetry axis of the object coincides with the symmetry axis of the flow field. The on-coming flow is in the XY plane. It can be seen from Figure 1 that it suffices to simulate only one-half of the space. Detailed description of the grid structure, specification of the initial position and velocity of the simulation molecules and the method of making-up molecules at the inlet of the flow field are all given in Ref. 4. A method for simplifying and treating collisions is taken from Ref. 2. The reflection of the molecules from the symmetry plane of the flow field ($Z = 0$) is assumed to be specular and the model for molecular reflection from the object surface is taken from Refs. 2 and 3.

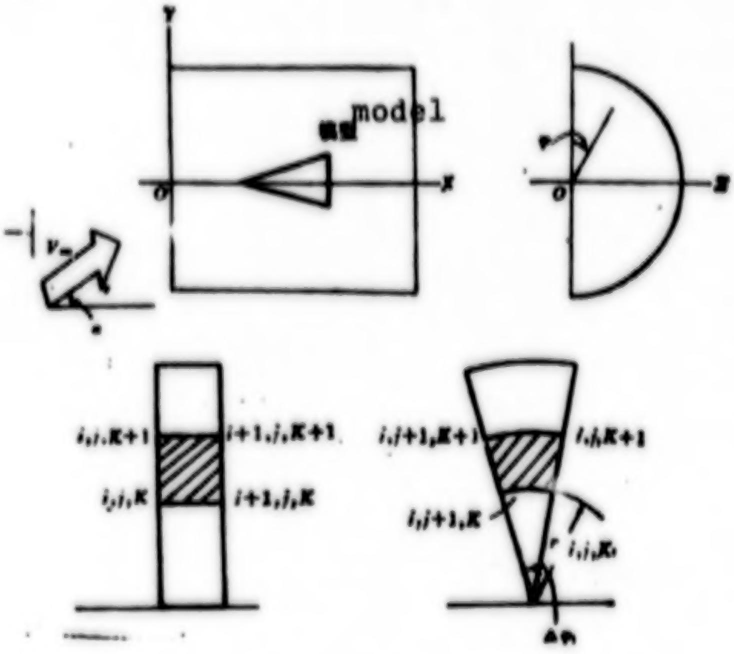


Figure 1. Three-Dimensional Flow Field and the Grid Division

In order to improve the simulation efficiency and expand the simulation region, we have also adopted a weighting technique. Weighting in here means giving different weights to molecules at different locations in the flow field, that is, letting them represent different numbers of real molecules. In this work we weighted along the axis of the flow field. Let $r_{i,j,k}$ be the radial coordinate at the grid node with indices (i,j,k). Due to the different weights, as a simulation molecule enters a new grid along the axial direction, it may annihilate, continue to exist, or generate several new simulation molecules. For example, when a simulation molecule leaves the grid at (i,j,k) and enters the grid at (i,j,k+1), random numbers should be used in predicting its continued existence. When

$$R_1 \leqslant \frac{2r_{i,j,k} + 1}{2r_{i,j,k+1} + 1}$$

the molecule continues to exist; otherwise, the molecule disappears. Here R_i is the random number for a uniform distribution in the (0 - 1) range. If the simulation molecule leaves the grid (i,j,k+1) and enters the grid at (i,j,k), then one molecule may generate several molecules. The integer part of the expression $(2r_{i,j,k+1} + 1)/(2r_{i,j,k} + 1)$ is the expected number of molecules produced with certainty. If the decimal part is greater than or equal to the random number R_i, the number of generated molecules will be increased by one; otherwise, it remains the same. For the case where several molecules are generated, the positions and velocities of the molecules must be treated artificially to insure that the velocities of the molecules generated are slightly different and no more than one molecule will occupy any point in space. Then, various aerodynamic characteristic parameters can be obtained by computing the collision between molecules and following and recording the position and velocity variations of each simulation molecule and carrying out the necessary data processing.

III. Analysis Results

In this work we made a series of computations using the method described above for the gas flow past combined bodies of revolution with an angle of attack. The external profile of the body of revolution is shown in Figure 2. The variation range of the on-coming flow parameter is s = 16 - 22 (here s is the ratio of the on-coming flow velocity to the most probable velocity of the thermal motion of the molecules); the ratio of wall temperature to total temperature is

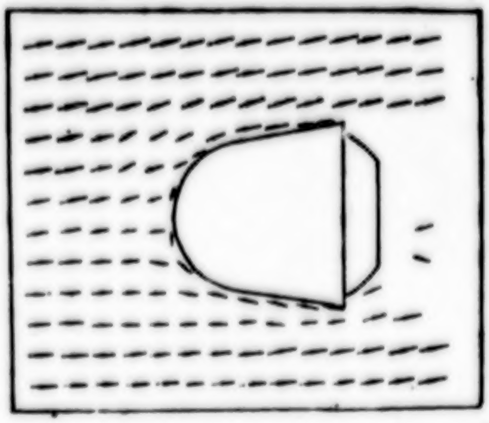


Figure 2. Profile of Velocity $(V_X^2 + V_Y^2)^{1/2}$

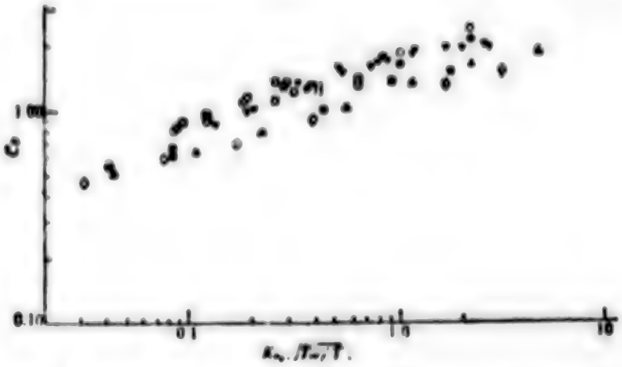
$K_{n_{D\infty}} = 0.167$, $S = 20$

$\tilde{T}_W = 0.1$, $\alpha = 10°$

$\tilde{T}_W = 0.1 \sim 0.13$; angle of attack is $\alpha = 0 \sim 20°$. Computations are made on a Chinese-made 013 computer with a floating point computing speed of 2 million operations per second and an internal storage of 130,000 words. Without weighting we have taken the initial number of molecules to be $3.10^3 - 10^4$. The dimensionless time interval $\Delta\tilde{t}$ is 0.01-0.04 ($\Delta\tilde{t} = \Delta t \cdot c_{m\infty}/\lambda_\infty$, where Δt, $c_{m\infty}$ and λ_∞ are respectively the time interval, the most probable velocity of thermal motion and the mean-free-path of the molecules in the on-coming flow). In order to eliminate the influence of nonequilibrium effects as much as possible, sampling begins after $40 \sim 60\Delta\tilde{t}$ and the sampling period is $40 \sim 80\Delta\tilde{t}$. When the angle of attack is zero, two regions are divided along the direction of the argument. When the angle of attack is not zero, it is divided into three or four regions. When weightings are used, the initial number of molecules is $1.5 \cdot 10^3 - 5 \cdot 10^3$.

Figure 2 is the velocity diagram obtained without weighting. Data are taken from the first region and the fourth region in the direction of the argument, they can be taken approximately as the aweather surface and the lee-side surface respectively. Length of the segments represents the magnitude of the velocity and arrows indicate the direction. Because the Z component of the velocity is ignored, the velocity given in Figure 2 is actually $\sqrt{V_X^2 + V_Y^2}$. The velocity diagram reveals several details of the flow. Firstly, there are obvious changes in the magnitude and direction of velocity near the stagnation point. Secondly, the disturbance experienced by the aweather surface of the object is greater than that of the lee-side surface. Finally, analysis of the flow field shows that, when the angle of attack α increases, the radial dimension of the flow field should be increased correspondingly so that the effects of the flow field boundary will not "reflect" to the surface of the object.

In order to compare two models of surface reflection, we have performed calculation for two sets of zero angle of attack. Figure 3 shows the computed resistance coefficient as compared to the experimental data.[5] The computed results are basically in agreement with the experimental data. Difference in the two models is insignificant, perhaps because the velocity of the on-coming flow is large.



符 号 1		设 备 2	M_∞	半锥角 3
□		AEDC Tunnel "L"	0.4, 10	15°
■		GE Shock Tunnel	21.7, 24.2	15°
▲		GE Shock Tunnel	21.7, 24.2	6°
◇		GE Shock Tunnel	21.7, 24.2	6° (钝) 4
▼		VKI. Free Jet	8.4	13.5°
▼			11.5	13.5°
○	本文 5	[2] 的反射模型 6	~22	10°
●	本文 5	[3] 的反射模型 7	~22	10°

Key:
1. Symbols
2. Apparatus
3. Semi-conical angle
4. (Obtuse)
5. This work
6. Reflection model in Ref. [2]
7. Reflection model in Ref. [3]

Figure 3. Comparison of the Theoretical and Experimental Resistance Coefficient c_D

Figure 4 gives the variations of the aerodynamic coefficient c_A, c_N, and c_m as a function of the angle of attack α, with α = 0°, 5°, 10° and 20°. The sampling period for α = 0° is 40$\Delta\hat{t}$, all others are 80$\Delta\hat{t}$. For α = 10°, the filled symbols represent calculation results without weighting. It can be seen that the weighting technique is successful. Figure 4 also shows the linear variation of c_N and c_m versus α and this result is entirely consistent with the conclusion drawn from rarefied gas experiment (when the angle of attack is not large).

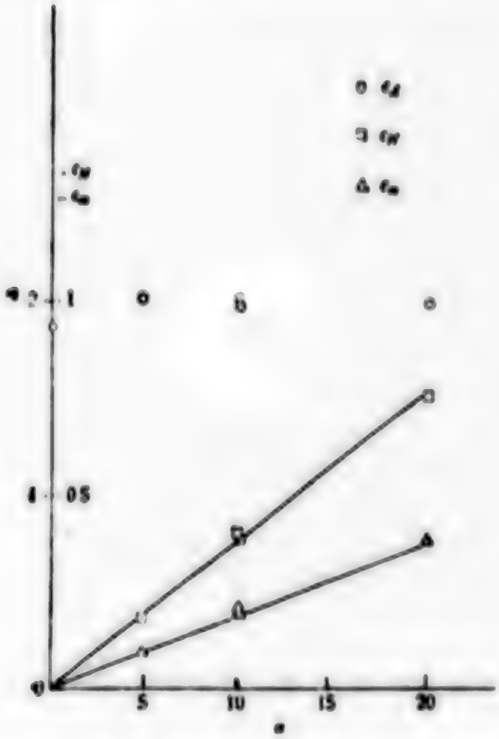


Figure 4. Variation of c_A, c_N, c_m Versus α

o c_A □ c_N Δ c_m

As for temperature, we present the isothermal diagram in Figure 5 where the lines connect points at the same temperature in the flow field. Since the wall temperature is low, a high temperature region is formed in front of the head, distributed roughly symmetrically about the stagnation point.

IV. Conclusion

In this paper we present a series of calculations for the rarefied gas flow past combined bodies of revolution. The results indicate that the three-dimensional statistical model built on the basis of the two-dimensional and axially symmetric flow calculations reported in Ref. 2-4 and the weighting technique adopted are successful.

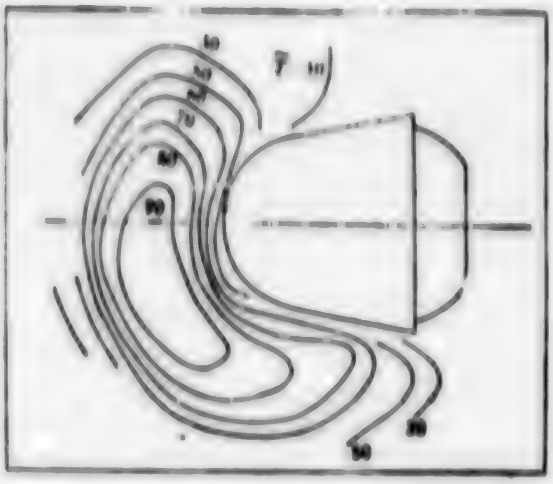


Figure 5. Isothermal Diagram

$s = 20 \quad \tilde{T}_W = 0.1 \quad \alpha = 20° \quad \tilde{T} = T/T_\infty$

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A High-pressure Gas-filled Ionization Chamber......Zhang Tinghua [1728 1694 5478], Beijing Bureau of Metrology (51)

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CSO: 4008/309

AUTHOR: HUANG Fengxin [7806 7364 0207]

ORG: Shigu Agricultural Station, Gaozhou County

TITLE: "Results and Essential Cultivation Technique of Shanyouliu in Heinitian [Black Mire Field]"

SOURCE: Guangzhou GUANGDONG NONGYE KEXUE [GUANGDONG AGRICULTURAL SCIENCES] in Chinese No 3, 8 May 81 pp 6-9

ABSTRACT: Shigu Commune is in the plain of south Gaozhou County, with 75,000 mu of cultivated land, of which 61,000 mu are paddies and 2/3 of these being black mire [not chernozem.] It is sandy, thin, and leaking water and fertilizer, to form the low yield area of the county. In 1980, the hybrid rice Shanyouliu was tested in 3225 mu of this black mire paddies and some river alluvial paddies. Obvious yield increase of 80-200 mu was obtained in all, regardless of the nature of the soil or the transplanting time. The highest historical yield record of over 1,000 was reached. The result was not only great in the fertile alluvium; the yield increase was also very great in the black mire. Detailed data of the performance of this hybrid, the origin of the hybrid, and the essential technique of cultivating it in the black mire paddies are explained.

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LIU Jingmei [0491 2529 2734]
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ORG: All of Plant Protection Center, Guangdong Provincial Academy of Agricultural Sciences

TITLE: "Research on Rice White Withering [Bacterial Leaf Blight] Strains in Guangdong"

SOURCE: Guangzhou GUANGDONG NONGYE KEXUE [GUANGDONG AGRICULTURAL SCIENCES] in Chinese No 3, 8 May 81 pp 17-22

ABSTRACT: From a collection of rice leaf blight pathogens, 211 strains are isolated. Using China's 5 standard breeds, 5 bacterial groups are identified. The rate of appearance is the highest for Group IV, amounting to 47.39 percent, followed by Group III, amounting to 23.22 percent. This fact indicates that these are strong strains and extensively distributed throughout the province. Group V, which is similar to the strong strains of Southeast Asia and capable of infecting the highly resistant breed IR26,has just begun to appear in Guangdong, amounting only 3.79 percent. The difficulty of breeding bacterial leaf blight resistant rice in Guangdong; therefore, lies in the complexity of breeding resistance to, at least, all these 3 groups. The existing major breeds of the province are all susceptible to the dominant strains (Group IV.) It is very urgent to find new source of resistance and strengthen the breeding work.

AUTHOR: Mantian Jiuhui [transliteration of Japanese Name]

ORG: None

TITLE: "Research on Simple Storage Method for Seeds of Rice, Wheat, and Peanut"

SOURCE: Guangzhou GUANGDONG NONGYE KEXUE [GUANGDONG AGRICULTURAL SCIENCES] in Chinese No 3, 8 May 81 pp 42-44

ABSTRACT: This paper describes experiments on techniques of storing seeds of rice, wheat, and peanut in separate sections. The different requirements for storing these seeds are explained separately to produce different principles of storing these seeds. The paper originally appeared in RESEARCH REPORT OF QIANYE COUNTY transliteration of Japanese place name] SEED FARM, No 1, 1979 pp 1-15. It is excerpted and translated by HUANG Chilin [7806 3589 2651.]

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CSO: 4009/326

Chemical Engineering

AUTHOR: HOU Yujun [0186 5713 6874]
ZHANG Bin [1728 1755]
TANG Hongqing [0781 1347 7230]

ORG: HOU and ZHANG both of Zhejiang University; TANG of the Design Institute of Lanzhou Chemical Company

TITLE: "Extension of Martin-Hou Equation of State into Liquid Region"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 1, Mar 81 pp 1-10

TEXT OF ENGLISH ABSTRACT: The range of application of the equation of state proposed by Martin and Hou for gases was extended into the liquid region. The improvement was achieved by retaining the constant, B_4, in the original equation, namely

$$P = \frac{RT}{V-b} + \frac{A_2+B_2T+C_2e^{-5.475T_r}}{(V-b)^2} + \frac{A_3+B_3T+C_3e^{-5.475T_r}}{(V-b)^3} + \frac{A_4+B_4T}{(V-b)^4} + \frac{B_5T}{(V-b)^5}$$

and imposing the condition, $\int_{V_1}^{V_v} PdV = P_o(V_v-V_1)$, on the equation. The constant, B_4, was then evaluated for a given compound.

The calculated values of the saturated liquid molar volumes for carbon dioxide, normal butane, argon, methand and nitrogen were compared with the data reported

[Continuation of HUAGONG XUEBAO No 1, Mar 81 pp 1-10]

in the reduced temperature range from about 0.65 to 1.0. The average deviation was less than 5 percent in each case, without loss of accuracy in the gaseous region. Furthermore, no additional data were required for evaluation of the constants of the improved equation.

AUTHOR: YU Guocong [0151 0948 3827]
HUANG Jie [7806 3381]

ORG: Both of the Department of Chemical Engineering, Tianjin University

TITLE: "Simulation and Efficiency of Large Tray. (I) Eddy Diffusion Model with Non-uniform Liquid Velocity Field"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 1, Mar 81 pp 11-19

TEXT OF ENGLISH ABSTRACT: An experimental study of the flow pattern and liquid velocity distribution by the tracer technique in a two-meter diameter single pass sieve half-tray using an air-water system reveals that there exists highly non-ideal flowing behavior. Typical residence-time distribution curves covering the whole tray deck are presented from which four flow regions can be observed: a main channeling region of non-uniform flow, a sideway region of accompanying subsidiary flow, a small region of backward flow and a complete mixing region next to the inlet weir. The tray models available in the present literature seem incapable of simulating all these complicated hydrodynamic phenomena in a large tray.

An eddy diffusion model with consideration of non-uniform liquid velocity field has been developed from the basic partial differential equation of mass transfer by introducing a velocity distribution function j. Since the experimental liquid

[Continuation of HUAGONG XUEBAO No 1, Mar 81 pp 11-19]

velocity profile follows approximately the exponential rule, function j can be taken in similar form with two experimentally determined constants which are dependent on the flowing condition.

The non-linear partial differential equation is solved by the finite element method. For this purpose, the equation should be transformed into elliptic form by multiplying an integrating factor β which is equal to exp [PejZ] where Pe is the Peclet number and Z is the dimensionless flow length. A computer program is designed according to this method to predict numerically the concentration profiles in the whole tray deck as well as the Murphree tray efficiencies under various operating conditions. Typical computed results are presented and discussed.

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ORG: All of the Chemical Engineering Department, Qinghua University

TITLE: "A Study of Particle Movement in a Gas-fluidized Bed"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 1, Mar 81 pp 21-28

TEXT OF ENGLISH ABSTRACT: A laser technique was developed for the purpose of investigating the movement of particles in a two-dimensional gas-fluidized bed. With the aid of this technique, three typical modes of these particles' movements influenced by the bubble were observed. A wake renewal length was measured. It was discovered that f_w, the ratio of wake volume to bubble volume, should be considered not as a constant throughout the bed but as a function of the bubble volume.

Under the same superficial gas velocity through the bed, the intensity of particle circulation was different at different heights and at higher levels more intensified circulation was observed.

AUTHOR: WANG Qixiang [3769 0366 4382]

ORG: Beijing Institute of Chemical Technology and Engineering

TITLE: "An Approach to the Design Theory of a Horizontal Tumbler Centrifuge--On Its Structural Characteristics, Vibration and Stability"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 1, Mar 81 pp 29-38

TEXT OF ENGLISH ABSTRACT: The design of a tumbler (precessional) centrifuge is based on the theory of precessional separation. It is a type of automatic, continuously operating filter centrifuge. This article contains two aspects:
I. According to the structural features of the horizontal precessional centrifuge, the horizontal type makes the movement of the drum more complicated than does the vertical type. However, our design was made on the basis of the mechanical model of "the stability conditions of rotation of a rigid body about a fixed point," and thus obtained the stable conditions and parameters of the drum. Theoretical analysis proved that dynamic characteristics of the precessional centrifuge are similar to those of the centrifuge which rotates about one single fixed axis with almost the same size drum. The structural characteristics will be analyzed and have been proved as follows:
(1) The productive capacity of the precessional centrifuge with low separation factor is similar to that of the other type of centrifuge which needs a much higher separation factor.

[Continuation of HUAGONG XUEBAO No 1, Mar 81 pp 29-38]

(2) The energy distribution ratio K between solid and hollow shafts of the drum can be obtained as the formula

$$K = \frac{T_{hol.}}{T_{sol.}} \approx \sin^2\theta$$

where θ is the angle between the rotating and revolutionary axis (solid and hollow shaft).

II. In accordance with the mechanical model of "the stability condition of the rigid body rotating about a fixed point," an important formula for steady work of the drum has been obtained

$$\frac{\omega_1 + \omega_2 \cos}{\omega_2} = \frac{\omega_1'}{\omega_2'} = \frac{2J_z}{(J_x + J_y)\cos\theta}$$

and condition $J_x < J_z < J_y$ of the drum can be avoided, where ω_1', ω_2' are the angular velocities of the solid and hollow shaft, ω_1, ω_2 are the rotating and revolutionary angular velocities of the drum, and J_x, J_y, and J_z are the moments of inertia of the drum with respect to the three principle axes X, Y and Z through the fixed point.

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TITLE: "A Study on Intrinsic Kinetics of Series 'A' Catalysts for Ammonia Synthesis"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 1, Mar 81 pp 39-50

TEXT OF ENGLISH ABSTRACT: Under conditions similar to those of industrial ammonia synthesis, the intrinsic kinetics of Series "A" Catalysts (A110, A106) made in China for ammonia synthesis have been investigated. After the experimental data was correlated by the corrective expression of the simple Temkin-Pyzhev equation, it was found that this equation is also valid for intrinsic kinetics of Series "A" Catalysts in ammonia synthesis.

With the aid of computation of the optimum program, we find that it is most satisfactory to take 0.5 as the value for a in the Temkin-Ptzhev equation. The apparent energy of activation has been found to be between 40,000-45,000 kcal/kg-mol. This agrees with the results found by previous workers. A suitable kinetics equation and kinetics parameters for application to engineering are suggested.

[Continuation of HUAGONG XUEBAO No 1, Mar 81 pp 39-50]

Through comparative study of kinetic data, the author has verified that the performance of catalyst A110 is better than that of A106 and of foreign-made commercial catalysts of the same type, especially in the lower temperature range.

AUTHOR: LI Shaofen [2621 4801 5358]
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ORG: All of the Department of Chemical Engineering, Tianjin University

TITLE: "The Kinetic Model for Catalytic Steam Reforming of Methane"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 1, Mar 81 pp 51-59

TEXT OF ENGLISH ABSTRACT: The kinetics of methane steam catalytic reforming reaction over Z102 nickel catalyst were investigated in an internal recycle gradientless reactor at atmospheric pressure. Experimental conditions were as follows: reaction temperature range 500-700°C, $H_2O/CH_4 = 2.5 - 4.5$ (molar ratio), methane space velocities 2,000 - 10,000 ml/h·g-cat. According to the analysis of the experimental results, the authors consider that carbon monoxide and carbon dioxide are formed together in these reaction processes, i.e., catalytic steam reforming of methane may be represented by the parallel reaction model. The rate equations of carbon monoxide and carbon dioxide formation

$$r_{CO} = k_1 P_{CH_4}^{0.8}$$

and

$$r_{CO_2} = k_2 P_{CH_4}^{0.8} P_{H_2O}^{1.5}$$

were obtained respectively. The dependencies of reaction rate constants k_1 and k_2

[Continuation of HUAGONG XUEBAO No 1, Mar 81 pp 51-59]

on temperature can be fitted in with the Arrhenius equation.

Some investigators considered that the water gas shift reaction equilibrium was attained very rapidly in the catalytic steam reforming of the methane process under usual operation conditions. Our calculations of experimental data show that this opinion is incorrect.

AUTHOR: HUANG Zhiyuan [7806 1807 3220]

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TITLE: "Kinetic Models for Hydroprocessing of Petroleum Fractions"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 1, Mar 81 pp 61-74

TEXT OF ENGLISH ABSTRACT: A mixed kinetic model with a computer program has been proposed for the processing of the hydrodesulfurization and hydrodenitrogenation experimental data which cannot be treated by first order or pseudo-second order kinetics. A brief review of the author's pseudo-second order kinetic model is also presented.

In the pseudo-second order kinetic model, a hyperbolic function of type $Y = \frac{\theta}{a + b\theta}$ is used to describe the experimental conversion level-reciprocal of LHSV curves. By defining the extreme value of conversion level Y_m under certain operating conditions and catalyst as $\lim_{\theta \to \infty} Y = 1/b$, it is possible to transform the above function to the following pseudo-second order kinetic equation:

$$\frac{-dc}{d\theta} = K(C - C_m)^2$$

where $K = b^2/a$, $C_m = C_0(1 - Y_m)$, $b \geq 1$

[Continuation of HUAGONG XUEBAO No 1, Mar 81 pp 61-74]

and the following model equation is obtained:

$$Y = Y_m - (KC_0e^{-E/RT} \cdot \theta + b)^{-1}.$$

The predicted values of percent conversion are in good agreement with the experimental values.

In the case when $b < 1$, the model fails to describe the behavior of conversion curves kinetically, so a mixed kinetic model is developed by assuming both the first and second order reactions can take place on the catalyst simultaneously. Thus the following kinetic equation is obtained:

$$Y = 1 - \frac{1}{C_0[(C_0^{-1} + K_2/K_1)e^{K_1\theta} - K_2/K_1]}$$

The rate constants K_1 and K_2 can be found on a computer by preassuming a series of K_2/K_1 ratios and K_1 values and then minimizing the sum of squares of the difference between experimental and predicted values of Y.

Generally the mixed kinetic model can be used for a broad range of kinetic data in hydroprocessing. However, in the case of $b > 1$, the pseudo-second order kinetic model seems to be preferred.

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TITLE: "The Determination of Rheological Behavior of Polypropylene Slurry and Its Correlation with Power Required for Agitation"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 1, Mar 81 pp 75-82

TEXT OF ENGLISH ABSTRACT: The rheological behavior of slurry of coarse polypropylene particles cannot be determined by means of ordinary viscometers due to its kinematic instability and "the wall effect" occurring in the measurement of viscosity.

After ascertaining the slurry of polypropylene to be a Bingham liquid by using the Brabender viscometer, the workers determined the plastic viscosity and yield value from the correlation between agitation power number and Reynolds number of Bingham liquid in the chemical vessel with a ribbon agitator. As a result, the basic data of heat transfer, mixing and agitation in the liquid bulk polymerization of propylene were provided.

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TITLE: "An Investigation of Liquid Membrane Separation of Potassium Ion--Facilitated and Active Transports of Potassium Ion"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 1, Mar 81 pp 83-88

TEXT OF ENGLISH ABSTRACT: The design of a liquid membrane system for the liquid surfactant membrane separation and concentration of K$^+$ for use in practice is presented. First, a suitable method of design is selected, the form of the apparatus used in this method being changed in a proper way. Then, the facilitated and active transports of K$^+$ are investigated. We predict: (1) the presence of NaCl in KCl will cause an increase in the flow of K$^+$; (2) this Cl$^-$ present may be one source of energy necessary for the active transport of K$^+$; (3) the flow of K$^+$ will be further increased if the Cl$^-$ present is replaced by Br$^-$ or I$^-$. The experimental results are consistent with the predictions. Finally, a concrete design is suggested.

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TITLE: "Application of the Stepwise Regression Method to the Circulation Test of Water in Waste Heat Boiler"

SOURCE: Beijing HUAGONG XUEBAO [JOURNAL OF CHEMICAL INDUSTRY AND ENGINEERING] in Chinese No 1, Mar 81 pp 89-95

TEXT OF ENGLISH ABSTRACT: Based on classical regression analysis, experiments were carried out under certain constraints on test conditions. Using the stepwise regression method, the equation for calculating the circulating water quantity of the coil-type waste heat boiler has been obtained. Experimental data were compared with results calculated by the said equation.

9717
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TITLE: "Pole Assignment of the Closed Loop System"

SOURCE: Beijing ZIDONGHUA XUEBAO [ACTA AUTOMATICA SINICA] in Chinese Vol 7 No 2, 1981 pp 81-87

TEXT OF ENGLISH ABSTRACT: This paper presents two methods of arbitrarily assigning the poles of the closed loop system under state feedback, using characteristics of structure companion canonical form of the complete controllable system and its direct connection with the polynomial matrix given by [1, 2]. The state feedback matrix K is easily defined. In addition, the assignment algorithm of the polynomial square matrix with given structure form and indicated invariant factor is presented. These methods are easily implemented on a computer.

AUTHOR: YU Zhenfu [0151 2182 1788]

ORG: Tianshui Institute of Electric Drive

TITLE: "Digital Code Network on N-Bit M-Number System and Its Calculation of the Parameters"

SOURCE: Beijing ZIDONGHUA XUEBAO [ACTA AUTOMATICA SINICA] in Chinese Vol 7 No 2, 1981 pp 88-98

TEXT OF ENGLISH ABSTRACT: This paper introduces a digital code network which applies to any bits and positive integral number systems. It is demonstrated that there are determinate relations between the parameters, such as between different level resistors of the network themselves, and between level resistors and terminal resistor, equivalent network resistor, output voltage at each point, maximal output voltage, utilization ratio of reference voltage, etc. A series of arithmetic equations are also derived. In this paper, general conditions of the binary and binary code-decimal network are discussed. When its level resistors are equal, obtained parameters agree with the parameters of commonly used network.

AUTHOR: TAN Weikang [6223 4850 1660]
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ORG: Both of Taiyuan College of Engineering

TITLE: "Optimum Allocation of Network Reliability"

SOURCE: Beijing ZIDONGHUA XUEBAO [ACTA AUTOMATICA SINICA] in Chinese Vol 7 No 2, 1981 pp 99-106

TEXT OF ENGLISH ABSTRACT: In this paper we consider the design of reliable systems having fixed topology. The problem is to find the optimal arrangement of the units which result in the maximum network reliability. We present a principle for finding the exact optimal solutions of reliability allocation problems. It is called the principle of optimum allocation. Three theorems are presented. Some examples illustrate the high efficacy of the proposed principle.

AUTHOR: JIANG Kalin [5592 0595 2651]

ORG: Shenyang Institute of Automation, Chinese Academy of Sciences

TITLE: "First Exploration for Character Equations"

SOURCE: Beijing ZIDONGHUA XUEBAO [ACTA AUTOMATICA SINICA] in Chinese Vol 7 No 2, 1981 pp 107-114

TEXT OF ENGLISH ABSTRACT: This paper proposes an α-exponential technique for the establishment of equations of various character-like patterns, and indicates the possibility of formulizing a single equation representing approximately a common character. Finally, a method for conformity check of data and equation is given, and some other questions are discussed.

AUTHOR: ZHANG Xianda [1728 6343 6671]

ORG: Changcheng Institute of Metrology and Measurement Technology, Beijing

TITLE: "A Mapping Method for Finding a Minimum Closed Cover of Incompletely Defined State Table"

SOURCE: Beijing ZIDONGHUA XUEBAO [ACTA AUTOMATICA SINICA] in Chinese Vol 7 No 2, 1981 pp 115-121

TEXT OF ENGLISH ABSTRACT: At present, when a sequential digital system is synthesized, there is no systematic method in respect to finding a minimum closed cover of incompletely defined state table. This paper presents such a systematic method.

First is a description of how to draw an implicit map of MC (maximum compatible) terms. Second, two methods of simplifying the map are given. Finally, applying the catch point's recursive selection and loop decomposition into the simplified map, we are able to determine a minimum closed cover from a set of maximum compatible terms.

For a more complex incompletely defined state table, this mapping method has obvious advantages over the trial-and-error method applied widely at present.

AUTHOR: YAN Chuangong [3547 0278 0501]

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TITLE: "A Group Control System (DNC) of Turning Machines with Computer"

SOURCE: Beijing ZIDONGHUA XUEBAO [ACTA AUTOMATICA SINICA] in Chinese Vol 7 No 2, 1981 pp 122-130

TEXT OF ENGLISH ABSTRACT: A DNC system operates a group of four all-purpose turning machines with a minicomputer of 12-bit word length and 4K word storage. This paper discusses how to choose an ideal process control, points out the possibility and means to develop the latent ability of the computer and shows the practical arrangement of the group control performance. As to machine works, this paper also reveals the concept and means in simplified digital programming on the spot which have already been put into actual practice with good results.

AUTHOR: LI Haitong [2621 3189 6639]

ORG: None

TITLE: "A Small Voltage Shaft Encoder"

SOURCE: Beijing ZIDONGHUA XUEBAO [ACTA AUTOMATICA SINICA] in Chinese Vol 7 No 2, 1981 pp 131-137

TEXT OF ENGLISH ABSTRACT: This paper presents a shaft angle to alternating current voltage to digit converter which is called the small-voltage shaft encoder. Based on bit-by-bit coding of the voltage comparison type, it uses the small voltage code and the sign bit code to form a scheme of converting all-range angle to digit. The angular measuring element is a triangular wave rotary transformer. As the voltage characteristic of the rotary transformer is sectionally linear, therefore this coder has performance qualities of high precision, high reliability, simple circuit and low cost.

AUTHOR: ZHANG Zhongjun [1728 6945 0193]
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ORG: ZHANG of Shanghai Jiaotong University; HOU of Xi'an Institute of Radio Technology

TITLE: "Mathematical Model of Economic Systems"

SOURCE: Beijing ZIDONGHUA XUEBAO [ACTA AUTOMATICA SINICA] in Chinese Vol 7 No 2, 1981 pp 138-147

TEXT OF ENGLISH ABSTRACT: This paper presents the formulation and role of mathematical models of economic systems. The history of evolution of the mathematical models is reviewed and the general steps for modeling are given. Some practical examples are given to illustrate how modern control theory is used in formulating macroeconomic and microeconomic models.

AUTHOR: JIANG Xinsong [5592 2450 2646]

ORG: Shenyang Institute of Automation, Chinese Academy of Sciences

TITLE: "A General Survey of Artificial Intelligence and Intelligent Control System"

SOURCE: Beijing ZIDONGHUA XUEBAO [ACTA AUTOMATICA SINICA] in Chinese Vol 7 No 2, 1981 pp 148-156

TEXT OF ENGLISH ABSTRACT: The present paper consists of five sections: 1) Introduction; 2) History and main research subjects of AI; 3) Progress in research on the kernel problem of AI; 4) Intelligent control system; 5) Conclusion. In this paper we propose using the principle of AI, especially the idea of an expert consulting system, to solve the difficulties encountered in identification and control of complex and large systems and to build a new type of control system--an intelligent control system.

9717
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AUTHOR: ZHANG Chuntian [1728 2504 3944]
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ORG: None

TITLE: "Theoretical Analysis and Experimental Research of PAL Comb Filter"

SOURCE: Shanghai DIANZI JISHU [ELECTRONIC TECHNOLOGY] in Chinese No 3, 30 Mar 81 pp 1-4

ABSTRACT: In PAL$_D$ color television receivers, there is a comb like filter composed of supersound delay lines. It separates the color signals before synchronous detection to overcome the phase sensitivity of NTSC. Generally the PAL delay line parameter is indicated by the delay time 63.943 μ sec. Related foreign literatures maintain that in the PAL system, there exists the shortcoming of a 57 millimicroseconds error between the delay time and the operating cycle (64 μ sec.) This paper analyzes the condition and concludes that the difference of the 63.943 μ sec and the 64 μ sec constitutes an ideal situation and the problem of an error of 57 millimicroseconds does not exist. Details of this argument and the experimental research are provided.

AUTHOR: HE Shoucai [0149 1343 2088]

ORG: None

TITLE: "Multi-path Computer Terminal"

SOURCE: Shanghai DIANZI JISHU [ELECTRONIC TECHNOLOGY] in Chinese No 3, 30 Mar 81 pp 23-26

ABSTRACT: At present, in China, as a rule, one customer occupies a computer and its external accessories at a time. Other customers can not have access to the computer until that customer is through with his terminal. This is called the single path terminal system. This is a very wasteful system. The computer must stay idle and wait, even when the customer is changing paper or doing other unrelated jobs, while a computer can complete 60 million instructions in a short period of 2 minutes, the duration for the customer to change the paper. In reality, a computer can be linked with 10 or more multi-path terminals to improve its use efficiency. This paper explains the advantages and applications of the multi-path terminal system, the hardware and software requirements, the multi-path communication linkage and long distance terminals, and the multi-path terminal and computer network.

6168
CSO: 4009/322

AUTHOR: YANG Guitong [2799 2710 6639]

ORG: Taiyuan Institute of Technology

TITLE: "A Generalized Variational Principle for Dynamically Loaded Rigid Plastic Bodies"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 1-12

TEXT OF ENGLISH ABSTRACT: In this paper a generalized variational principle for dynamically loaded rigid-plastic bodies is given. Two theorems are proved for the cases of small and large deformation respectively. The application of the first theorem to thin shells is briefly discussed.

AUTHOR: WANG Huakui [3769 5478 1145]
ZHAO Qinping [6392 3084 1627]

ORG: Both of Taiyuan Institute of Technology

TITLE: "The Differentiation of the Fuzzy Logic Function"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 13-25

TEXT OF ENGLISH ABSTRACT: In this paper the differentiation of the fuzzy logic function is defined with two methods: 1. The fuzzy logic function is taken as the extension of two-valued logic function (viz., Boolean function) from {0, 1} to [0, 1]; 2. Fuzzy logic is the continuous-valued logic and its function is considered to be the continuous function in the interval [0, 1]. Some properties of the differentiation of the fuzzy logic function are studied and its calculation methods are also presented.

AUTHOR: WANG Xiaoxiong [3769 1321 7160]

ORG: Taiyuan Institute of Technology

TITLE: "The Common Architecture Design of Cinemas for the City of Tangshan"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 26-34

TEXT OF ENGLISH ABSTRACT: This paper deals with several problems of the common architectural design of cinemas with 1000 seats for the city of Tangshan, such as layout in plan, plan combination, design of the audience hall and other art arrangements. In this paper the theoretical analysis of the rational plan of design and problems in practice is also given.

AUTHOR: GAO Mingyuan [7559 2494 6678]

ORG: Taiyuan Institute of Technology

TITLE: "The Hydraulic Calculation of Indoor Water Supply Pipe System"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 35-43

TEXT OF ENGLISH ABSTRACT: This article mainly offers the calculating method of an indoor pipe system for the symmetric arrangement of indoor sanitary fixtures. The method itself deals with the working conditions for the maximum designed discharge of a closed circuit in selecting the meeting point and deciding the calculating pipe lines, and then regulating the pipe diameters for the calculation. In the article examples of the kind and number of sanitary fixtures are given.

AUTHOR: DING Shuren [0002 2885 0086]

ORG: Taiyuan Institute of Technology

TITLE: "A Numerical Solution for Transverse Vibration of Thin Plates"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 44-54

TEXT OF ENGLISH ABSTRACT: This paper deals with the use of the curved finite difference scheme and two-step numerical integration method to solve the vibration problem of thin plates. A simple example is given, and the results agree fully with the exact solution.

AUTHOR: WU Juxian [0702 5468 6343]

ORG: Taiyuan Institute of Technology

TITLE: "The Optimization of Pore Structure of Vanadium Catalyst Used for Sulfuric Acid in Industry"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 55-64

TEXT OF ENGLISH ABSTRACT: This article deals with the optimization of pore structure of vanadium catalysts and suggests the adoption of the different types in differing temperature ranges of a sulfur dioxide reaction. For example, when the temperature of an oxidizing reaction is over 480°C, it is appropriate to use the vanadium catalyst of a pore radius within 2000-10,000 Å, while in the later period of this oxidizing reaction it is appropriate to use the vanadium catalyst with slight pores.

AUTHOR: SHAO Jiahui [6730 1367 6540]

ORG: Taiyuan Institute of Technology

TITLE: "The Graphic Calculating Method of the Characteristic of Bicircular Arc Gear Engagement"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 65-75

TEXT OF ENGLISH ABSTRACT: The graphic calculating method of the characteristic of bicircular arc gear engagement expresses the whole process of bicircular arc gear engagement graphically. By means of the graph the theoretical calculating formula can be inferred, and the alternative process of gear tooth engagement can be seen directly so as to ascertain the weak link of the gear teeth and offer a reliable basis for the design of bicircular arc gears.

AUTHOR: XU Zhong [1776 6850]
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TITLE: "Research on the Phenomena and Characteristics of Double Layer Glow Discharge in Ion Nitriding Equipment"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 76-89

TEXT OF ENGLISH ABSTRACT: In this article, double layer glow discharge is discussed in terms of the theory of gas discharge and experiments on ion nitriding equipment and technology. Using two kinds of test instruments, we have determined the main parameters of the double layer discharge phenomenon and have clarified essentially our understanding of its characteristics.

AUTHOR: WANG Furen [3076 6534 0088]
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TITLE: "The Selection of Parameters of the Torque Control Device in the Dongfanghong 390-type Fuel Injection Pump"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 90-100

TEXT OF ENGLISH ABSTRACT: In this paper we have introduced the calculating method for the selection of the main parameters of the torque control device in the Dongfanghong 390-type fuel injection pump, as well as the results of experimental research. Through experimental analysis the effect of the main parameters of the device on the fuel delivery characteristic has been ascertained, the proper combination of the parameters is put forward, and, in addition, its availability is proved by means of the performance tests in diesel engines.

AUTHOR: XIE Kechang [6200 0344 2490]

ORG: Taiyuan Institute of Technology

TITLE: "Kinetics and Mechanism of Sulfur Dioxide Oxidation on Vanadium Catalysts"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 101-124

TEXT OF ENGLISH ABSTRACT: In this paper the internal and external studies on kinetics and mechanism of SO_2 oxidation on vanadium catalysts over the past 50 years are reviewed, and 64 published equations of the reaction rate of intrinsic kinetics are presented and compared by making use of a new approach proposed in this paper, with their authenticity discussed. "The non-dimensional variable of reaction rate" is put forward, and, starting with the investigation of the effect of the different mathematical forms of equations upon the rate change in the reaction, some typical equations are calculated and compared, then the hitherto systematized mechanism of the reaction is analyzed and the close relationships between the mechanism and the equation are expounded.

AUTHOR. WANG Wenchang [3769 2429 7022]
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TITLE: "The Stress-Strain Relationship for Concrete"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 125-138

TEXT OF ENGLISH ABSTRACT: The complete stress-strain curves involving falling branches for concrete in uniaxial compression and their approximate expressions suggested by domestic and foreign investigators are briefly summarized and discussed in this paper. Some of them are emphatically reviewed. With respect to the formula suggested by P. T. Wang, et al., a new approach is presented and expressions for the stress-strain relationship inferred directly from concrete quality with a statistical analysis method are proposed. By using the data of recent experiments made by Tianjing University, an analysis is carried out. The results obtained are quite satisfactory.

AUTHOR: XIE Keming [6200 0344 2494]

ORG: Taiyuan Institute of Technology

TITLE: "A Summary of Electricity Generation by Wind Power"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 139-157

TEXT OF ENGLISH ABSTRACT: A brief account of the historic development and modern study of electricity generation by wind power both domestically and abroad is given in this paper. The principle, construction and classification of different windmills are roughly stated; the constituents and electric power generation methods of wind-driven generating stations are summarized and some typical wind-powered electric generation equipment of small, medium and large sizes built from 1931 to 1980 are tabulated. In addition, future prospects and some existing problems are reviewed.

AUTHOR: WANG Jinhua [3769 6930 5478]

ORG: Taiyuan Institute of Technology

TITLE: "The Discussion of the Physical Process for the Transistor-Collector Junction from Reverse Bias to Forward Bias"

SOURCE: Taiyuan TAIYUAN GONGXUEYUAN XUEBAO [JOURNAL OF TAIYUAN INSTITUTE OF TECHNOLOGY] in Chinese No 1, 1981 pp 158-162

TEXT OF ENGLISH ABSTRACT: This paper illustrates the physical essence transferred for the collector junction from reverse bias to forward bias. A new view in the analysis of the dynamics process is introduced for the nonneutral majority carriers. The conclusion is as follows: 1) If only at the p-n junction on both sides do the nonneutral majority carriers appear (namely, in the p region nonneutral holes are shown, in the n region nonneutral electrons show), the p-n junction will certainly become narrow. On the other hand, if at the p-n junction on both sides appear nonneutral minority carriers, the p-n junction will certainly become broad. 2) The state of electroneutrality of p and n regions is the stable condition of the breadth of the p-n junction.

9717
CSO: 4009/281

Iron and Steel

AUTHOR: HE Enshang [0149 1869 6339]
JIANG Hengsheng [5592 0077 0524]
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ORG: All of the Beijing Steel Works

TITLE: "On the Improvement of Hot Plasticity of High Speed Steel W18Cr4V by Rare Earth Elements"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 4, 1981 pp 1-8

TEXT OF ENGLISH ABSTRACT: Experiment results show that by adding a certain amount of mischmetal to high speed steel W18Cr4V, its hot plasticity can be improved considerably without impairing other properties.

Results of examination of metallography, quantitative metallography, ionprobe, electronprobe and scanning electron microscopy show that the mechanism of improving the hot plasticity of high speed steel W18Cr4V consists mainly in the enrichment of rare earth elements at the grain boundaries. 1) Refinement of carbides and improvement of carbide distribution inhibit the formation of micropores on the interphase plane between carbides and austenite; 2) Cleaning the grain boundaries of impurities and improving the intergranular properties that defer the crack propagation along the crystal boundaries.

AUTHOR: SUN Yaoqing [1327 1031 0615]

ORG: Huazhong Institute of Technology

TITLE: "Analysis of the Features of Fractures of Matrix Steel 65Cr4W3Mo2VNb"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 4, 1981 pp 9-15

TEXT OF ENGLISH ABSTRACT: In the present paper, the mechanism of fractures has been discussed in conjunction with the impact, torsion, compression, flexure properties and fracture toughness of 65Nb steel, by means of studying the micro-fractrograph and macro-fractograph of the fracture surface. Experiment results show that the fracture of 65Nb steel after quenching and tempering is a quasi-cleavage fracture, and possesses certain characteristics differing from those of structural steels.

The tear ridge may be regarded as the most essential characteristic of the quasi-cleavage fracture. It was found that the differences in configuration, size and distribution of tear ridges of quasi-cleavage fractures symbolize the difference in strength and toughness of the materials. The ability of plastic deformation in the micro-zone of the matrix of the material is closely related to the quasi-cleavage fracture. Different stress states lead to dofferent fracture mechanisms.

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LI Jixin [2621 4949 2946]
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ORG: All of the Central Iron and Steel Research Institute

TITLE: "Investigation of the Tempering Process of Ultrahigh Strength Steel 406"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 4, 1981 pp 16-20

TEXT OF ENGLISH ABSTRACT: The rules of changes in mechanical properties of 406 steel during tempering have been studied. The fine structure of martensite and the type, morphology, and distribution of carbide precipitates have been examined under a transmission electron microscope. The interrelation between the mechanical behavior and the martensite substructure has also been studied. The results indicate that 406 steel possesses high strength and high toughness after quenching and tempering at 300°C. The fine structure is lath martensite with high dislocation density. The majority of fine needle-like precipitates within martensite have been identified to be ε-carbide, which is highly coherent with the matrix, by electron diffraction pattern analysis. Thin films of 2-3 percent retained austenite in net form have been distributed between martensite laths. This steel contains 1.5 percent silicon and 0.5 percent molybdenum, so that the stability of ε-carbide and retained austenite can be maintained to a higher temperature, thereby delaying and

[Continuation of GANGTIE No 4, 1981 pp 16-20]

retarding the embrittlement trough of tempered martensite and improving the fracture appearance. In addition, the temper embrittlement at about 360-500°C is due to the precipitation of cementite in interlath surface and the segregation of impurities at grain boundaries.

AUTHOR: LI Yiyi [2621 0181 0181]
ZHANG Mingqi [1728 7686 1477]

ORG: LI of the Institute of Metal Research, Chinese Academy of Sciences; ZHANG of Fushun Steel Works

TITLE: "Structures and Properties of the 21-6-9 Cryogenic Steel"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 4, 1981 pp 21-27

TEXT OF ENGLISH ABSTRACT: The present work is concerned with the 21-6-9 cryogenic steel. The mechanical and physical properties as well as the structural stability have been studied systematically from room temperature to liquid helium temperature.

The 21-6-9 steel features strengthening by N and improved cryogenic magnetic properties by Mn. It shows a desirable combination of high strength, high toughness at 4K, and higher antiferromagnetic temperature T_N. T_N is between 130 and 143 K, depending on the different methods of measurement. It has excellent magnetic stability below T_N.

It was found that the magnetic permeability is between 1.0019 and 1.0025 from 300 to 4K. Results of the work show that the strain induced martensite transformation occurs during heavy deformation from 83 to 4K. The lath martensites

[Continuation of GANGTIE No 4, 1981 pp 21-27]

were identified by magnetic metallography, by thin film transmission electron microscopy and X-ray diffraction analysis to be of two types, i.e., hcp ε-martensite and bcc α'martensite. No martensitic transformation took place during cooling.

AUTHOR: YAN Shuo [0917 7007]
XU Sisheng [1776 1835 4141]
WANG Yulin [3769 3022 7792]

ORG: All of the Institute of Metal Research, Chinese Academy of Sciences

TITLE: "A New Ca-Si-Ba-Al-RE Complex Deoxidizer"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 4, 1981 pp 28-33

TEXT OF ENGLISH ABSTRACT: A new complex deoxidizer Ca-Si-Ba-Al-RE alloy (CSBA) was developed for improving the effect of calcium on the inclusion control. Because the calcium and barium contained in this alloy are completely soluble in each other in the liquid state, it is possible for the vapor pressure of calcium to be significantly decreased and its solubility in steel increased at steelmaking temperatures. The effect of calcium may, therefore, be obviously improved.

CSBA can and does improve the properties of steel castings and billets by providing improved inclusion morphology. For example, the impact strength of 16Mn cast steels is increased from 2 $kg \cdot m/cm^2$ to 10 $kg \cdot m/cm^2$ and the "stratified structure" on the 35CrNi1Mo structural steel fracture has been removed.

AUTHOR: CUI Wenxuan [1508 2429 2537]
LI Wenqing [2621 2429 0615]
DAI Pinguang [2071 0756 0342]

ORG: All of Beijing University of Iron and Steel Technology

TITLE: "Grain Refinement and Properties of Plain Low Carbon Steel in the Controlled Rolling Process"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 4, 1981 pp 34-42

TEXT OF ENGLISH ABSTRACT: The effects of initial grain size of austenite d_{A0}, temperature of deformation T_D, and amount of deformation per pass ε percent in the controlled rolling process were investigated. It was found that these parameters have great influences upon the onset and extent of recrystallization of the austenite, and subsequently upon the grain size and structure of austenite, and upon the final grain size of ferrite (d_F) transformed from the austenite. A complex quantitative relation between them can be shown by the formula

$$d_F = [55\mathrm{th}(\frac{d_{A0} - 90}{25}) + 110]\varepsilon^{-1} + (T_C - 750)^{1/2} + 0.027d_{A0}$$

In addition, the ductile-brittle transition temperature FATT (°C) of a controlled rolled low carbon steel is related to the ferrite grain size by the expression

$$\mathrm{FATT}(^\circ C) = A + 2.2P\% - Bd_F^{-1/2}$$

A,B are constant, $A = -12(^\circ C)$, $B = 8^\circ C/mm^{-1/2}$

AUTHOR: ZHANG Weijing [1728 4850 2417]

ORG: Beijing University of Iron and Steel Technology

TITLE: "A Mathematical Model for the Dissolution of a Secondary Phase and the Homogenization in the Matrix Phase in a Binary Alloy"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 4, 1981 pp 43-49

TEXT OF ENGLISH ABSTRACT: A mathematical model and its numerical solution for the dissolution and the homogenization process of a secondary phase which is controlled by the diffusion of the solute in the matrix phase in a binary alloy were suggested. According to the suggested model and its solution, a computing program was worked out and the calculation of the dissolution of the carbide and the homogenization of carbon in austenite and the homogenization of chromium during the diffusional annealing with the aim of the elimination of the structural defects resulting from liquation in the 1.5Cr-1C steel was conducted, and this steel is regarded as approximately a binary alloy but affected by the third component. The calculated results provide some valuable data for further analysis of the microstructure in this steel.

9717
CSO: 4009/275

Machines

AUTHOR: LUO Jialiang [5012 1367 2733]

ORG: Shanghai Machine Tool Plant

TITLE: "Impressions of the USA Machine Tool Industry"

SOURCE: Shanghai JIXIE ZHIZAO [MACHINERY] in Chinese No 5, May 81 pp 19-20

ABSTRACT: In the autumn of 1980, the author was a member of the Chinese Industrial Science, Technology, Management Observation Team and visited 19 machine tool plants and other factories of the USA. The companies briefly introduced in the paper include Brown and Sharpe, Cincinnati Milacron, Zagar, Warner and Swasey, Ex-Cell-O, and some unnamed job shops. In the USA, machine tool products are designed to satisfy customers in every way possible. This is what the Chinese designers cannot do. The quality of electronic, electrical, and hydraulic components of Chinese made machine tools is poor, according to USA brokers contacted by the author and this is the important factor in the way of expanding the export market of these tools. Shortcomings of USA machine tool industry, the author believes, include (1) The young are more interested in service industries instead of joining the ranks of machine tool workers who have no passion for what they do either; (2) The market fluctuation causes the investors to lose confidence; therefore, the possibility of future expansion of productivity is not great; (3) The cost of production is too high to enable USA machine tool manufacturers to compete on the international markets. These shortcomings, the author adds, provide a favorable condition for China.

AUTHOR: ZHOU Yongxin [6650 7167 9515]

ORG: Shanghai Radio Plant No 18

TITLE: "High Molecular Fluid Sealing Resin--Fluid Washer"

SOURCE: Shanghai JIXIE ZHIZAO [MACHINERY] in Chinese No 5, May 81 p 40

ABSTRACT: Sealing washers made of rubber, leather, asbestos, paper, etc. are traditionally used to seal the joints of components of machines to prevent leakage of gas or liquid. These solid seals are labor consuming to make and after prolonged use they will have to be replaced. In recent years, the Shanghai Radio Plant No 18 has adopted high molecular fluid resin as the substitute. The fluid seals used in the laths, milling machines, and television assembly lines at the plant have been observed more than one year and no leakage phenomenon has been discovered. Three types of fluid washers, 601, 602, and 609, made in China are now available. The first 2 types do not become a membrane after they are dried, and are suitable for parts that are in need of being taken apart regularly. The No 609 is a phenol-formaldehyde butyronitrile resin. It easily forms a membrane. It adheres to parts very firmly and is elastic and withstands vibration very well. It is, therefore, suitable wherever the grade or the gap is relatively great.

AUTHOR: None

ORG: Shanghai Electrical Motor Machinery Plant

TITLE: "The CPD 0.5 Miniature Battery-operated Forklift"

SOURCE: Shanghai JIXIE ZHIZAO [MACHINERY] in Chinese No 5, May 81 p 47

ABSTRACT: This paper describes the CPD forklift made by the plant and displayed in the recent Shanghai Industrial New Products Exhibition. It is designed to have a maximum lift capacity of 0.5 tons and is equipped with a rechargeable battery. It will operate continuously for 8 hours after every charge. Its applications and structural characteristics are introduced, and the paper also serves as an announcement of the plant that the forklift is ready for orders from customers. The front cover of this issue of the journal carries a photo depicting this small forklift.

AUTHOR: None

ORG: Shanghai Scale Plant

TITLE: "The QZ205 Optical Project Screen"

SOURCE: Shanghai JIXIE ZHIZAO [MACHINERY] in Chinese No 5, May 81 p 48

ABSTRACT: The optical photographic screen enlarges the size of the cut of a paper cutting machine and projects the size on a screen to form an optical component of the paper cutter. It can control the size of the paper to be cut by the machine. This paper introduces the work theory, the parameters, and the method of applying the QZ205 optical projection screen, which is a product of the Shanghai Scale Plant. The paper claims that prolonged use of this instrument by a large number of customers has proved its quality and earned a good reputation in China and abroad.

6168
CSO: 4009/320

AUTHOR: DU Guide [2659 2710 1779]

ORG: None

TITLE: "A New Type of Launching Device"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 6, 81 pp 10-12

ABSTRACT: This paper introduces the mass transmission device, a metal pipe, measuring 5 miles (8.045 km) in length, leaning on a slope of a Colorado mountain, with its base firmly established on the launching pad located at the foothill of that mountain. This is purposed to be a new device for launching effective loads into space, using electrical power instead of rocket power. This new device can project one ton of effective load every minute off the earth's surface or a dozen or so loads of less than one ton each per second from the surface of the moon. The many uses of this device and the history of its creation are explained.

AUTHOR: YANG Shu [2799 2885]

ORG: None

TITLE: "The Soon-to-be-Born Electromagnetic Cannon"

SOURCE: Beijing KEXUE SHIYAN [SCIENTIFIC EXPERIMENT] in Chinese No 6, 81 pp 20-21

ABSTRACT: The electromagnetic cannon utilizes the passage of electrical current through a conductor to gasify it into plasma which is capable of moving in an electromagnetic field to project a bullet. According to reports in foreign journals, the Pentagon of the USA has appropriated one million in 1979, 3 million in 80, and 5 million in 81 for the research of making the electromagnetic cannon but, of course, there will not likely be such a usable weapon before 1990. The key problems have already been resolved, however. There remain such minor items as the miniaturization of the system, the energy source requirements, the weight reduction, etc. to be taken care of for it to be operable. Some people believe that a test had been carried out in the USSR to destroy a satellite of another country with a lead pellet. It is possible that this type of lead pellet is launched from an electromagnetic cannon.

6168
CSO: 4009/321

AUTHOR: ZHANG Shouzhong [1728 1343 0022]
CHEN Peili [7115 0160 5461]
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ORG: ZHANG and CHEN both of the Organic Chemistry Teaching and Research Group, Shanghai College of Textile Technology; YUAN of the Shanghai Textile Science Research Institute

TITLE: "A Study of the Partially Hydrolyzed Product of Polyacrylamide as a Leveling Agent"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 4, Dec 80 pp 1-7

TEXT OF ENGLISH ABSTRACT: A new leveling agent, SFH, is recommended in the present paper. It is prepared by hydrolyzing polyacrylamide (1 mol.) with sodium hydroxide (0.5 mol.) at 40°C for four to six hours. SFH is a proper leveling agent, especially for disperse dyes in thermosol dyeing process for polyester/cotton blend fabrics.

The leveling agent SFH has had good effects on diminishing the defects caused by neps and bars, and on improving the leveling dyeing and also the dyeing fullness of fabrics. This leveling agent is especially fit for T413 light green blue, T412 light green blue and pale purple colors. When leveling agent SFH is used for these colors it can improve the dye-fixation and reduce dye consumption by approximately 10 percent.

[Continuation of SHANGHAI FANGZHI GONGXUEYUAN XUEBAO Vol 6 No 4, Dec 80 pp 1-7]

Experimental results show that these advantages closely resemble those revealed by the imported product "Premsol AMK."

By simply measuring the infrared spectrum of this leveling agent, the quality of the agent can be easily controlled in its commercial production.

AUTHOR: ZHOU Hong [0719 9464]
CHEN Shuilin [7115 3055 2651]
YANG Wenlin [2799 2429 3829]

ORG: All of the Shanghai College of Textile Technology

TITLE: "Studies of a New Redox Initial System for the Polymerization of Vinyl Acetate in Methanol Solution"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 4, Dec 80 pp 8-13

TEXT OF ENGLISH ABSTRACT: This paper suggests a new redox initial system for the polymerization of vinyl acetate in methanol solution. The influences of the polymerization degree on the composition of initial agents, monomer concentration and the temperature of polymerization were studied. Also determined were the degree of side chain, 1.2 glycol content, iodine adsorption, IR spectra and some physical properties. It is found that the lower polymerization temperature benefits the increasing of the regularization and improving the physical properties.

AUTHOR: XIA Zhengxing [1115 2973 5281]

ORG: Shanghai College of Textile Technology

TITLE: "The Performance of Vacuum Aluminized Fabric for Protection against Thermal-radiating Heat"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 4, Dec 80 pp 14-20

TEXT OF ENGLISH ABSTRACT: This paper suggests aluminizing a "mirror-image" structured fabric made of polyimide fiber. Several test methods of heat transmission through the fabric are discussed, and the transmissivity tested by a single phase thermo-galvanometer of manufactured fabric is about 4.61 percent.

AUTHOR: ZHOU Qicheng [0719 0796 3397]

ORG: Shanghai College of Textile Technology

TITLE: "Optimization of the Method of Selecting the Tooth Number Series in a Set of Change Gears. Part II: The Rules for Permuting the First Order Differences between Logarithms (FODBL) of the Tooth Numbers in a Set of Change Gears and Some Intercalated Sets of the FODBL"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 4, Dec 80 pp 21-36

TEXT OF ENGLISH ABSTRACT: The problem in practice of determining the proper combination of z_i in a set of n change gears may be abstracted to the problem of finding the proper combination and permutation of the elements $a_{i,\ i+1}$ of the set A_1 of the FODBL to give maximum $\overline{M-d}$ (Notations are the same as in Part I).

In Part I, we presented some results finding the optimal combination of the elements of Set A_1. In this part, some rules for permuting these elements are introduced. Three kinds of intercalated sets of the FODBL have been found:

1. Set A_1 with even left wing;
2. Set A_1 with coincidence of both wings;
3. Set A_1 with circulated elements.

In the given example, a set of 12_{+1} change gears (instead of 33 for current

[Continuation of SHANGHAI FANGZHI GONGXUEYUAN XUEBAO Vol 6 No 4, Dec 80 pp 21-36]

machines) are enough for ring spinning frames to give draft from 9.71 to 41.2 in 101 steps with step difference < 2.2 percent, and another set of the same amount of change gears (instead of 19 for the current machines) for the same machine to give twist from 190 t/m to 1314 t/m in 101 steps with step difference < 3 percent.

This method is practical and may be used for designing sets of change gears for any kind of machine (not merely confined to textile machinery). The analyses made in the paper may perhaps be useful in studying combinatorial mathematics.

AUTHOR: WU Hanjin [0702 3352 6855]
ZHENG Peifang [6774 0160 5364]

ORG: Both of the Shanghai College of Textile Technology

TITLE: "On Geometric Structural Phases of Fabrics and Their Applications"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 4, Dec 80 pp 37-42

TEXT OF ENGLISH ABSTRACT: The authors follow the route enlightened by the idea put forward by F. T. Pierce, et al., of the geometric structure of fabrics. For the convenience of practical applications, states of the geometric structure have been divided into 11 phases. Discussion has been carried out as follows: 1. The cover factors (ε'_j, ε'_w) of compact fabrics of fundamental weaves; 2. The concept of the "phase-forming effect," according to which the upper limits of the cover factor (ε_j) of fabrics, such as cotton poplins and khaki twills, have been given; 3. The concept of one-dimension compact fabrics has been established and a method of estimating structural phase proposed; 4. The proper interrelationship between tex numbers of warps and fillings has been given.

The foregoing statements are applicable in laying out specifications of fabrics as well as in achieving a better comprehension of their physico-mechanical properties.

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TITLE: "On the Testing Methods and Calculations of Shrinkage of Knitted Fabrics"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 4, Dec 80 pp 43-50

TEXT OF ENGLISH ABSTRACT: In this paper an analysis of variance has been made for the effects of some main factors on the testing results obtained by the testing methods in use. The mode of drying was found to be of prime importance, followed by the direction of the flow and the ingredients of the solution. These factors appeared to affect the linear shrinkage and the area shrinkage in different ways.

At the 5 percent level, such factors as tumble drying, reciprocal flow and soap solution are significant in length shrinkage, but not in width shrinkage. Tumble drying is more significant than the others in area shrinkage.

In general, the differences between the linear shrinkages under two separate marks (along the wale lines or along the course lines) are significant at the 5 percent level, but this is not the case with area shrinkages.

It has been proved by experimental results that the routine method for testing shrinkage by one laundering-drying cycle is of practical use. With tumble drying,

[Continuation of SHANGHAI FANGZHI GONGXUEYUAN XUEBAO Vol 6 No 4, Dec 80 pp 43-50]

the correlation coefficients of the linear shrinkages between the first and fifth treatments are larger than 0.9, and those of area shrinkage are larger than 0.51. With hang-drying, they are 0.73 and 0.58 respectively. In these cases, the critical values of their correlation coefficients are the same, i.e., 0.497 at the 5 percent level.

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ORG: FAN of the Scientific Research Group, Jiangsu Provincial Sales and Supply Cooperative; ZHANG of the Shanghai College of Textile Technology

TITLE: "The Smitt Circuit Featuring the Regulation of Hysteresis by Varying Only One Threshold Value--The Photoelectric Transducer and Circuit of the Hairiness Tester"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 4, Dec 80 pp 51-59

TEXT OF ENGLISH ABSTRACT: From the principle of threshold value regulation of the Smitt circuit in the operational amplifier, the theoretical basis of compensating and clamping methods has been determined, with results from experimental verification being attached. By analyzing the interrelationships among some basic curves, the key to the further improvement of the performance has been brought into view, thus making it possible to vary only one trigger value with the other trigger value remaining constant when regulating the hysteresis of the Smitt circuit.

This novel type circuit is capable of directly transferring (shifting) photoelectric signals of a single fiber into counting pulses, sensibility being less than 5 mV and input impedance greater than $10^6 \Omega$. When hysteresis range value increases by

[Continuation of SHANGHAI FANGZHI GONGXUEYUAN XUEBAO Vol 6 No 4, Dec 80 pp 51-59]

390 times, the variation of one of the trigger values is only 2.1 mV, being of high stability.

These methods can also be used to identify and test other weak signals, which is helpful in flexibly and adaptably designing and applying the operational amplifier Smitt circuit and in accurately setting up trigger values and hysteresis of the Smitt circuit.

AUTHOR: QIAN Yunqing [6929 0061 7230]
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ORG: Both of the Shanghai College of Textile Technology

TITLE: "Design of Interface for DJS-051 Microcomputer Used in System of Yarn Quality Test and Data Processing"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 4 Dec 80 pp 60-66

TEXT OF ENGLISH ABSTRACT: This article describes the technological characteristics of reeled yarn strength test and weight test as [illegible] in the course of the application of microcomputers. A knowledge of [illegible] characteristics has led the author to designing the data channel interfacing.

A detailed account is given of data format, status information, processing of data input, as well as their working principles. In addition, methods for controlling the technological processes are also touched upon.

AUTHOR: HUANG Runfa [7806 3387 4099]

ORG: Shanghai College of Textile Technology

TITLE: "Design of Software for DJS-051 Microcomputer Used in System of Yarn Quality Test and Data Processing"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 4, Dec 80 pp 67-74

TEXT OF ENGLISH ABSTRACT: In this paper a systematic description is made of the design of software for DJS-051 microcomputer used in the system for testing yarn strand strength, weight and data processing, emphasizing the essential problems involved in the development of the system software and their solutions.

It is concluded that:
1. With a computer control system requiring manual manipulation, those features characterized by technological processes must be made full use of in designing the control programs, not disregarding, of course, the coordination of the hardware; and, on the basis of the fundamental functions having been fulfilled, necessary additional functions should be furnished so as to reassure the reliability of the operation of the entire system.
2. In consideration of the shortness of word length and the limits of the present storing capacity of the DJS-051 computer, it is more reasonable to apply double

[Continuation of SHANGHAI FANGZHI GONGXUEYUAN XUEBAO Vol 6 No 4, Dec 80 pp 67-74]

precision (or quadri-precision) fixed-point arithmetic and adopt a serial program of tabulating, i.e., to carry out the forming of data layout and the printing simultaneously. This is because these measures will enhance the accuracy of calculation and the visuality of tabulation.

AUTHOR: YANG Sirang [2799 1835 6245]
GU Dingfang [7357 7844 5364]
et al.

ORG: Both of the Shanghai College of Textile Technology

TITLE: "The Application of Photoelectric Hairiness Tester"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 4, Dec 80 pp 75-83

TEXT OF ENGLISH ABSTRACT: The methods used to determine the "hairiness index" of a yarn on the photoelectric hairiness tester are discussed in this paper.

During the series of experiments yarns must be compared on the basis of their distribution of protruding length. However, with a protruding length of 3 mm, incorrect conclusions may be arrived at disregarding the general condition of hairiness. As a rule, the longer the protruding length, the greater the dispersion of its distribution. The coefficient of variation decreases with the increase of the tested length of yarn. Therefore, the proper lengths and numbers of tested samples must be chosen according to the protruding length tested.

Using these methods, the relation between some technological parameters and the "hairiness index" of the tested yarn has been explored. The total number of

[Continuation of SHANGHAI FANGZHI GONGXUEYUAN XUEBAO Vol 6 No 4, Dec 80 pp 75-83]

hairinesses decreases from the bottom to the top of a bobbin, but this is not true of hairinesses longer than 3 mm. The increase of traveller weight has no significance on the variation of the yarn hairiness. Its average length, however, is reduced. The use of a condenser in the front drafting zone of a ring spinning frame brings about the same effect on hairiness as the traveller weight. The rewinding of bobbins increases significantly both the total number and length of hairinesses of a Dacron/wool blended yarn, some primary analyses of which have been explained.

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ZHU Shuiyun [2612 3055 0061]
ZHENG Lisui [6774 4409 2979]
ZHOU Meihua [0719 5019 5478]

ORG: All of the Shanghai College of Textile Technology

TITLE: "Calculation of the Plate-tower for the Transesterification of Dimethylterephthalate and Ethylene Glycol"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 4, Dec 80 pp 84-89

TEXT OF ENGLISH ABSTRACT: The concurrently operated column reactors may behave much like a plug-flow tubular reactor and the time of reaction required may then be calculated accordingly. However, in this way it reflects nothing about the relationship between the reactant concentration or conversion rate and the number of column plates. Nor can the effect of plate structure and operating conditions on the result of reaction be predicted. In this paper, the plate column reactor is analyzed as such, and through the actual calculation of the DMT-EG ester exchange being cited as an example, the relation between the conversion rate and the number of column plates required for 90 percent conversion of DMT was established. An elementary discussion is also made on the efficiency of the plate as reactor.

AUTHOR: YANG Qing [2799 7230]

ORG: Shanghai College of Textile Technology

TITLE: "An Analysis of the Decimal Numbers for Anti-ribbon on the Loom-winder"

SOURCE: Shanghai SHANGHAI FANGZHI GONGXUEYUAN XUEBAO [JOURNAL OF SHANGHAI COLLEGE OF TEXTILE TECHNOLOGY] in Chinese Vol 6 No 4, Dec 80 pp 90-93

TEXT OF ENGLISH ABSTRACT: This article discusses the principles and methods for the determination of the decimal numbers for the anti-ribbon. A concept with respect to uniform distribution of odd numbers and even numbers of yarn loops has been put forward. The author has drawn the conclusion that an eight-point uniform distribution is the most reasonable.

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